## REMARKS

Claims 1-3, 5-7, 9, 10, 12-17, 19-22, 24 and 25 are pending in the present application, claim 23 having been cancelled herein. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

Claims 22-23 were objected to and rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Applicant has amended claim 22 to recite "a software product comprising computer implementable instructions and/or data for carrying out the methods according to Claim 1, stored on an appropriate computer readable medium." Applicant respectfully submits that this amendment overcomes the objection and the rejection, and that claim 22 is now directed to statutory subject matter under § 101. Withdrawal of the objection and rejection is respectfully requested.

Claims 1-3, 6-7, 9, 12-17, and 19-25 were rejected under 35 U.S.C. § 102(b) as being anticipated by Nattkemper et al (US Patent 5,999,518). Claims 5 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nattkemper et al (US Patent 5,999,518) in view of Chiu et al (US Patent 6,597,689). These rejections are respectfully traversed for the following reasons.

Claim 1 recites a method of handling ATM traffic comprising streams of packets of AAL5 type composed of ATM cells, at a network node at VP-layer, the method comprising providing a database, monitoring each of the cells incoming the node and determining at least VC-layer and VP-layer parameters of a cell being monitored, processing information on the determined parameters, registering the processed information concerning each of the cells in the database, by using the registered information, forming statistical data with respect to at least

combinations of the VC-layer and VP-layer parameters of the packets being handled at the node, so as to make the network node, handling the ATM traffic at VP-layer, aware about nature and behavior of various AAL5 streams in a particular VP connection, and analyzing the statistical data, performing packet discard at the VP layer by making decisions on possible discard of the cells being monitored, the decisions depending on results of analysis of the statistical data, thereby taking into account frequency of appearance, in the database, of a combination of VC-layer and VP-layer parameters of a particular cell being monitored. This is not taught, disclosed or made obvious by the prior art of record.

Applicant has amended claim 1 so that it now:

a) positively claims those steps of the inventive method, which are distinctive from Nattkemper, namely: the step of forming statistical data and the step of packet discard at the VP layer;
b) replaces the words "analyzing information registered in the database" with the phrase "analyzing the statistical data", and
d) explicitly recites that the packet discard at the VP layer is performed, and namely - by making cell discard decisions dependent on the analysis of the statistical data.

The support to the amendment is readily found throughout the original description, for example, on page 5 line 14, page 9 lines 24-26, on page 11 lines 15-19, and further up to page 12, line 22. Fig. 1 and its corresponding description also form support, since both Fig. 1 and its disclosure clearly demonstrate that ATM packets (which might be discarded at the VP layer 20), appear in their original form at the VC layer 10 which comprises various VC connections, and that each ATM packet consists of cells. Fig. 2 illustrates a data base, Fig. 3 illustrates how the statistical data is formed in the data base, Figs. 4 A,B,C illustrate how the

statistical data is utilized for making cell discard decisions which result in judicious packet discard at the VP layer. Accordingly, no new matter is presented by the amended main claim.

Before referring to the specifics of the rejection, Applicant will discuss the invention and explain how it differs from the technology disclosed in Nattkemper.

The present invention proposes a method for handling congestions between ATM cells at a Virtual Path (VP) layer where cells of multiple AAL5 Virtual Channel (VC) connections are intermixed in one or more Virtual Paths (VP) connections. The method is unique in that it allows utilizing a packet/frame based discard policy at the VP layer.

The prior art precludes utilizing packet/frame based discard policy at the VP layer, due to the lack of formal information at the VP layer about the underlying VC layer. Therefore, only a so-called cell based discard policy, having low efficiency, is possible at the VP layer.

Moreover, when ATM traffic is configured using SNMP (Simple Network Management Protocol), the ATM adaptation layer five (AAL5) traffic streams are formally undefined on the VP layer. That is, the VP layer is not aware as to whether the cells stream it carries forms packets/frames, or each cell in the stream is independent of all other cells.

Until the EPD/PPD (or FPD) discard mechanisms were invented, ATM systems used to discard cells by a cell-based mechanism (*i.e.*, a congested cell would be discarded without discarding the whole affected packet). This caused the problem described in Nattkemper (column 17, lines 56 to 60), *i.e.* the cell level discarded cells "invoke packet level retransmits at packet sources which …can quickly cause severe congestion". All known EPD/PPD mechanisms, including the one described in Nattkemper, solve this problem for the Virtual

Channel (VC) layer. Since the EPD/PPD mechanism was not applicable to virtual path (VP layer), the problem remained and the ATM systems operating at VP layer were forced to discard cells with the default cell-based mechanism.

***The present invention allows the EPD/PPD packet discard mechanisms to be used on the virtual path (VP) layer,*** which is non-trivial (taking into account the absence of the VC layer awareness at the VP layer). For example, as an ATM node operating at a VP layer is not aware about the virtual channel (VC) layer of the traffic, it also cannot determine which virtual channel is "in a discard eligible state."

The proposed technology allows an ATM node, operating at the VP layer, to "snoop" and gain information regarding to the VC layer by monitoring the VPI (VP index) and VCI (VC Index) values of each arriving cell, determining and registering them to obtain a statistic data for further estimating frequency of cells belonging to different VC connections that are multiplexed in each VP connection. Based on that statistical information, the present invention allows discarding as many cells as required from a VP connection, while practically eliminating the influence of such a discard operation to as few AAL5 packet VC connections as possible within that VP connection.

Contrary to the invention, in the prior art methods and in the method of Nattkemper, cells are discarded from a VP connection irrespective of the relationship between the discarded cells and AAL5 packets to which the cells belong. Therefore, more AAL5 packets will be affected by the Nattkemper discard operation, than those which might be affected by the inventive method.

**Rejection of Claim 1 (and claims 22, 24)**

Neither the paragraphs (col. 4 lines 35-36, col. 14, lines 60-62) cited by the Examiner, nor the remaining text of Nattkemper describe methods of handling ATM traffic at VP-layer similar to that claimed in Applicant's Claim 1. On the contrary, Nattkemper describes and emphasizes - in numerous places of the patent specification - that the process of packets discard he proposed takes place at the Virtual Circuit Connection (VCC) level.

For example, col. 14 describes a Logical Architecture of the switching system proposed in Nattkemper. Lines 8-13 of col. 14 explicitly define that the Switching subsystem 100 supports advanced queuing and congestion avoidance policies, and that it is permanent Virtual Circuit (PVC)-based.

Though Nattkemper mentions that the switching unit 104 supports both VP and VC connections (col. 4 lines 35-40), it is relevant only to the routing purposes (see col. 4, lines 40-43).

Nattkemper speaks about processing cells, but not VC & VP parameters (col. 7 lines 9-10 cited by the Examiner). Even further, line 65 of col. 7 says "cell statistics gathering" but neither mentions nor means any processing/gathering of statistics on the two parameters VP and VC.

Nattkemper even states that *"The VP connections consist of unknown VCs"* (Col 28, line 32). In any version described in Nattkemper, where a two-stage lookup strategy of an incoming cell is mentioned, never both the VP-descriptor and the VC-descriptor are defined together. For example:

Fig. 3 explicitly shows that the technology of Nattkemper either determines the VP-descriptor, or the VC-descriptor, but never requires both of them simultaneously.

Column 37, lines 20-26, comprises a statement that "*software provisions for VPs and VCs are mutually exclusive on a per port basis.*"

Column 25, lines 57-67 and col. 26, lines 1-5 describe "Virtual circuit validation" as a two stage process. The first stage is to see if a VP connection is provisioned for an ingress cell. The second stage is the Virtual Circuit lookup, and the second stage is triggered by the VP lookup failure.

In view of that, the following three conclusions can be made concerning Nattkemper:

1) at the VP layer there is no check of VC parameter, 2) at the VC-layer there is no indication of VP parameter, 3) Nattkemper does not disclose determining both VP and VC parameters, and (of course and in particular) does not propose doing that at the VP layer.

Moreover, Nattkemper does not disclose determining the VP-index (VP-descriptor) + the VC-index (VC-descriptor) for each incoming cell. Nattkemper cannot describe (and it is natural) that VP and VC parameters are registered in their combination in any database for forming statistical data. Neither of the Nattkemper text portions or drawing positions cited by the Examiner against Claim 1 (Fig. 6, statistics to CPU, column 21, lines 64-66) speak about any similar issue.

On the contrary, col. 51, lines 31-60 of Nattkemper describe another kind of statistics, which is "the required" statistics concerning a PHY and an ATM layer. A local system specific statistics can be collected, for example the statistics concerning discard events at a cell

level. However, Nattkemper does not comprise any description of how it can be done. The only hint in Nattkemper concerning statistics is that the statistics can be gathered at periodic intervals as required by PHY or at other intervals. With all examples found in col. 51 lines 31-60, Nattkemper fails to describe/suggest that information about a combination of the determined VP and VC parameters per each incoming cell is registered to obtain statistical data.

The Examiner further contends that Nattkemper analyzes information (col. 4, lines 38-39) registered in the database and makes decisions on possible discard (Fig. 4, (83)). However, in col. 4, lines 38-39, Nattkemper only mentions that VP and VC routing information is comprised in ATM cells and that the information included in each cell is analyzed. Since Nattkemper does not register combinations of VP, VC parameters in the data base to provide statistical data, he cannot analyze that statistical data.

The Examiner finally contends that the text in col. 22, lines 1-3 of Nattkemper describes that discard of a specific monitored cell is decided by taking into account frequency of appearance of a combination of its VP and VC parameters in the database. Applicant respectfully disagrees. The text in col. 22, lines 1-3 mentions only the VC parameter and describes nothing in common with the final limitation of Claim 1. The text neither mentions a combination of VP, VC parameters, nor associates a discard decision with any frequency of appearance of any combination in a data base.

Keeping in mind the comments concerning Claim 1, all the dependent claims (including claims 22 and 24) should also be considered patentable, at least as being dependent on the patentable Claim 1.

Neither of the Examiner's further citations against dependent claims can change the fact that Nattkemper discloses nothing about and is unable to perform packet-based discard at the VP layer.

Claim 2 depends from claim 1 and describes how an ATM packet is defined, specifies the VP and VC parameters as VPI and VCI, mentions that cells of one and the same ATM packet have the same VP and VC parameters, and further describes how, based on Claim 1, the network node may be aware about behavior of various VCCs in a particular VPC (VP connection) by checking frequency of appearance of these VCCs at the VP layer using the statistical data in the data base.

Against Claim 2, the Examiner cited column 28, lines 1-3, column 53, lines 1-10, col. 21, lines 64-66, col. 11, lines 33-35.

Though Nattkemper mentions in col. 28, lines 1-3 that "the aggregate of the upstream VCI/VPI are evaluated," there is no any statistical evaluation of various combinations of VC and VP parameters. Col. 28 in the paragraph of lines 27 to 40 comprises explanation that the known Discard strategies EPD and PPD are used in Nattkemper only at VC level and for AAL5 streams. Indeed, *"The VP connections consist of unknown VCs and provide a statistically multiplexed traffic stream that remains within some bandwidth limit. Thus, it is reasonable to discard cells if the VP stream exceeds these limits. In the VC case, on a per-VC basis, the system may be provisioned with AAL attribute when the PVC* ***[permanent virtual circuit- emphasized added]*** *connection is established. Therefore, only the AAL5 (or similar) encoded streams are candidates for the EPD and PPD discard strategy."* This means that no EPD/PPD is employed for VP streams in Nattkemper.

The cited text portions in column 53, lines 1-10, col. 21, lines 64-66, and col. 11, lines 33-35 discuss routing, queuing and discarding of cells, but any discard decisions are performed only at the VC layer.

Indeed, lines 14-29 of column 21 make clear that Nattkemper's PPD/EPD discard is performed a) at the level of virtual circuits (VC); b) by a random cell discard; c) by further discarding cells belonging to the same packet as the discarded cell (*i.e.*, belonging to the same VC).

*Contrary to Nattkemper which describes either primitive cells discard or packet discard at the VC layer, the proposed invention claimed in Claim 1 and Claim 2 allows performing judicious packet discard at the VP layer.*

With respect to claim 17, in the text portion col. 26, lines 45-46 cited by the Examiner, Nattkemper speaks about a queue, not a data base and about writing a cell to the queue – not checking whether a VCC parameter is registered in the data base. The text portion in col. 24, lines 26-36 also speaks about queues, about per-VC accounting policy and per-VC discard of cells at the VC level depending on the cell rate (MCR) at the VCC.

For at least these reasons, Applicant respectfully submits that claims 1-3, 5-7, 9, 10, 12-17, 19-22, 24 and 25 are patentable over the prior art of record whether taken alone or in combination as proposed in the Office Action.

In view of the above amendment and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections of record. Applicant submits that the application is in condition for allowance and early notice to this effect is most earnestly solicited.

If the Examiner has any questions, he is invited to contact the undersigned at 202-628-5197.

Respectfully submitted,

BROWDY AND NEIMARK, P.L.L.C.
Attorneys for Applicant(s)

By /Ronni S. Jillions/
Ronni S. Jillions
Registration No. 31,979

RSJ:ma
Telephone No.: (202) 628-5197
Facsimile No.: (202) 737-3528
G:\BN\E\eci\Stein10\Pto\2009-04-30Amendment.doc